QUANTA

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Information on the Association

Membership of QUANTA, the independent QL user group, is by annual subscription. The Membership Secretary can supply full details. Copies of the association's constitution & annual accounts are available from the Secretary. There is an extensive software library. There are active national subgroups. Details are given in the Member's Guide and in this magazine.

QUANTA Committee - 2006/2007

CHAIRMAN'S NOTES   John Mason

John Gregory – Honorary Member

I am pleased to report that Committee in recognition of some 13 years service to QUANTA, mainly as Software Controller, has decided to make John Gregory an Honorary Member.

The work of Software Controller is almost completely unseen. He must be able to read all software submissions no matter on which kind of media they have been provided. Verify that they do that which the programmer says they are intended to do, get bugs rectified, and ensure that they have adequate running instructions before adding them to the Software Library.

It had been hoped to present engraved glass beer jugs to John and Mary at the 2007 AGM. Unfortunately they were unable to attend so the jugs were presented to them at their home in Royston on Friday 5th May.

COPY DATE for AUG/SEP 2007 ISSUE is:

5TH AUGUST 2007

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All Contributions are Welcome.
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Quanta Magazine

Q U A N T A

Independent QL Users Group

World-wide Membership is by subscription only,
offering the following benefits:
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Massive Software Library – All Free!
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Regional Sub-Groups. One near you?
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Now in our Twenty Fourth Year

Further details from the Membership Secretary

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Tel. +44 (0) 161 865 2872**

Or

**Visit the New Quanta Web Site
http://www.quanta.org.uk
*E-mail: membership@quanta.org.uk***

(Chairman's Notes - Continued from page 3)

QL is 25

In the April/May Magazine Sarah spoke of the desire to hold a party to mark the 25th Anniversary of the launching of the Sinclair QL and the formation of QUANTA.

The intention is to hold a ONE STOP, TWO DAY, QUANTA WORKSHOP with speakers, a QL Historic Exhibition, Traders, a Celebratory Dinner and including overnight accommodation all under one roof – all probably along the lines of QL is 21 at Portsmouth.

Ideas, Suggestions, Thoughts and Volunteers please by email to:

Secretary@quanta.org.uk

COMMITTEE PRECIS   Sarah Gilpin

Since I have already reported in detail on the email meetings and on the usual Post AGM meeting in the April/May Magazine, there is very little else to report this time.

However, the committee has not hibernated (far from it!). They are all working hard at their various jobs and trying to find ways of improving the workings of QUANTA in various ways.

The Chairman notes (on page 3) that we are in need of a software controller/librarian to take over the software library and bring it into the 21st. Century. There are software authors out there who are able and willing to provide all kinds of software for the QL, but their efforts are currently "stacking up" at QUANTA for the sake of someone to deal with them.

The Chairman also comments on the idea of a "QL is 25" Workshop in 2009 - possibly on the lines of "QL is 21" in 2005 at Portsmouth.

NOW is the time to input your thoughts and ideas for this event. With **your** help and input, it will be an event by **YOU,** for **YOU** to enjoy. All comments please to Sarah Gilpin at secretary@quanta.org.uk

Is it what you want?   Where?   When?   Can   **YOU** help? (or do **YOU** know a man (or woman) who can??)

G.P.S. On the QL (2)   Hugh Rooms

(In this continuation of Hugh's intriguing article, I have omitted any graphic images which were printed in previous parts in order to save space - Ed).

GPS Data

From the data sent from my receiver to QPC, I can display, as alternatives, the track across ground, figure 9, which I use when carrying the equipment in the car; or the orbits extending across the sky, figures 5, or 8; a nice picture to watch when at home with the receiver stationary for a long period.

The receivers available, and I have studied only the two I've owned, do a tremendous amount of processing on the data received, and output the results as a stream of ASCII codes. The data format is specified by the USA National Marine Electronics Association (NMEA)(9), in the form of 'sentences'. Each starts with a '$' sign and an identifying string, and terminates with a check sum and <CR><LF> codes. My present module outputs a default set of five sentences every second, seen in figure 4 and at the bottom left of figure 7. The data sheet for the device says that it can be programmed in a number of ways to change its behaviour, but I have not investigated that, and won't mention it again.

Figure 4
Showing two blocks of five typical data lines.

```
$GPGGA,111656.00,5047.66176,N,00040.25166,W,1,05,1.73,00015,M,047,M,,*79
$GPGSA,A,3,01,23,11,20,28,,,,,,,,2.65,1.73,2.00*0C
$GPGSV,2,1,08,01,46,072,43,17,42,297,29,11,66,130,35,20,74,241,35*70
$GPGSV,2,2,08,14,16,037,32,23,26,177,33,24,33,291,26,28,10,251,32*76
$GPRMC,111756.00,A,5047.66170,N,00040.25170,W,000.0,134.1,240406,05.4,W*07


$GPGGA,111758.00,5047.66170,N,00040.25171,W,1,06,1.35,00016,M,047,M,,*74
$GPGSA,A,3,01,11,20,23,14,28,,,,,,,2.00,1.35,1.47*08
$GPGSV,2,1,08,01,46,071,43,17,43,297,,11,65,130,34,20,74,242,35*78
$GPGSV,2,2,08,14,15,037,32,23,26,177,32,24,34,291,,28,10,251,33*76
$GPRMC,111852.00,A,5047.66167,N,00040.25172,W,000.0,344.3,240406,05.4,W*0F
```

Note: the empty line is not sent by the GPS module, it is inserted to make it easier to see what is going on.

My hardware converts and sends this data as RS232 signals to the PC.

A typical sentence is the first one sent each second:

$GPGGA,123519,4807.038,N,01131.000,E,1,08,0.9,545.4,M,46.9,M,,*47

which, noting that data fields are delimited by commas, translates as:

```
$GP         Header code for all sentences
GGA         Global Positioning System Fix Data: Name and type of data
123519      Fix taken at 12:35:19 UTC
4807.038,N  Latitude 48 deg 07.038' N  }degrees: minutes and decimals
of minutes ..
01131.000,E  Longitude 11 deg 31.000' E  }.. are run together
1           Fix quality: 0 = invalid
                    1 = GPS fix (SPS)
                    2 = DGPS fix
                    3 = PPS fix
                         4 = Real Time Kinematic
                         5 = Float RTK
                6 = estimated (dead reckoning) (2.3 feature)
                         7 = Manual input mode
                         8 = Simulation mode
08          Number of satellites being tracked
0.9         Horizontal dilution of position (I will explain this later)
545.4,M     Altitude, Metres, above mean sea level
46.9,M      Height of geoid (mean sea level) above WGS84
              ellipsoid
(empty field) time in seconds since last DGPS update
(empty field) DGPS station ID number
*47         the checksum data, always begins with *
```

I must admit that I don't know what a lot of this means, and at present I don't use this data at all except to recognise the start of each second's transmission.

To get it out of the way: the checksum, present in every type of sentence, is the 'XOR' of the binary of all code between '$' and '*', expessed as two hex characters. My function 'CheckSum' probably gives a better explanation than words would.

I found that data is often corrupted, and doesn't conform with the standard. It is also apparent that different module manufacturers interpret the NMEA standard in different ways (surprise, surprise), particularly in the number of characters in each field. So a considerable amount of checking is needed to eliminate potentially misleading data. My program doesn't always do the checks -- a combination of "couldn't be bothered (CBB)" and "It Works So Why Fix It? (IWSWFI)". That is: I often do rely on the data being in the format expected. Where this does result in corrupted data further checks usually cut it out. The last real field often ends at the '*' that denotes the checksum, instead of a comma; until I realised this and allowed for it (in the 'field$' function) it caused a lot of unexplained crashes.

There are many more of these sentence forms defined, but just four types, including $GPGGA, are sent each second by the device I use, (one type, $GPGSV, is sent twice to make the five mentioned, as I will explain). The other types, in the sequence they are sent, are:

$GPGSA,A,3,04,05,,09,12,,,24,,,,,2.5,1.3,2.1*39

Where:
   GSA   Satellite status
   A   Auto selection of 2D or 3D fix (M = manual)
   3   3D fix - values include: 1 = no fix
                     2 = 2D fix often happens if trees etc spoil the signal
                   3 = 3D fix only this really is a 'good' fix
  04,05... PRNs (identification numbers) of satellites used for fix (space for 12)
   2.5   PDOP (dilution of precision): this is horizontal and vertical combined
   1.3   Horizontal dilution of precision (HDOP)
   2.1   Vertical dilution of precision (VDOP)
   *39   the checksum data, always begins with *

A 3D fix is the best, with good visibilty to at least four satellites. If only three are available then it is still possible to get a fix using the line to the origin of co-ordinates by assuming an elevation above where it cuts the ellipsoid. If the ellipsoid was a true sphere, then the height would not matter, but, with eccentricity, the height assumed must be close to the true height for a '2' fix to be accurate, so really they are only any use near sea level.

The question of what "height" is, is gone into at great length in (6).

PRNs -- "Pseudo Random Noise", and no, I don't understand this; for more information see (10).

The DOPs I have mentioned earlier, and this sentence quantifies them. The range is 1 (perfect position) to 50 (completely lost). Anything under 3 is pretty good. Vertical (VDOP) is always the worst, as GPS is intended primarily to give a horizontal position.

From the $GPSGSA sentence I extract the identifiers of the satellites actually used to derive the position at this instant.

$GPGSV,2,1,08,01,40,083,46,02,17,308,41,12,07,344,39,14,22,228,45*75

Where:
    GSV   Satellites in view
    2   Number of sentences for full data
    1   sentence 1 of 2
    08   Number of satellites in view

    01   Satellite PRN number
    40   Elevation, degrees
    083   Azimuth, degrees, clockwise from North
    46   SNR - (Signal to Noise Ratio?) higher is better, a measure of the quality of the signal.
    The above four fields repeated for up to 4 satellites per sentence

    *75   the checksum data, always begins with *

There are usually two $GPGSVs sent each second, listing all the satellites in view with their position in the sky, the basis of my sky display. From it I also get the "Satellites In View" list which includes those not actually used in the present fix.

Curiously, the module I have misses out the SNR for the last satellite on each line.

Finally:

$GPRMC,123519,A,4807.038,N,01131.000,E,022.4,184.4,230394,003.1,W*6A

Which translates as:

    RMC   Recommended Minimum Content
    123519   Fix taken at 12:35:19 UTC
    A   Status A= Active or V= Void. A void line is not a reliable fix.
      4807.038,N   Latitude 48 deg 07.038' N   } degrees: minutes and
decimals of minutes ..
    01131.000,E Longitude 11 deg 31.000' E } .. are run together
    022.4   Speed over the ground in knots
    184.4   Track angle in degrees True, measured clockwise from North
    230394   Date - 23rd of March 1994
     003.1,W   Magnetic Variation, not always given: an empty field ",," is
shown instead
    *6A   The checksum data, always begins with *

        I extract the current latitude and longitude, date and time, and the track and speed for the displays. Note that the GPS receiver can have no idea which direction it is facing, you can't use it as a compass: it can only take successive positions at known times and from them calculate track and speed.

        The display in my set up is a second or two behind the real time of the data because of the processing time in the hardware and in QPC, and the track display is updated only after the program's 'Delay' time, so it tends to smooth out sharp bends in the track.

Greater Accuracy

        Looking at a latitude given in the $GPRMC sentence as, say, 51 degrees 43.26815'N, and remembering that one nautical mile is one second of arc on a great circle such as a meridian, we see that the 43 represents nautical miles in 1852 metre units; so the 2 is in 185 metre units, the 6 is in 18.5 metres, the 8 a bit under 2 metre units, the 1 is a unit of 18.5 centimetres, and the 5 in 18.5 mm units. We should expect those last few digits to be unreliable, and the best latitude for this reading from one receiver is 51 degrees 43.268'N, with the last digit a bit doubtful. For longitude, each minute is one nautical mile multiplied by the cosine of the latitude, about 0.63 for Southern England, or around 1100 metres per minute of arc, so the later digits of a longitude are even more unreliable.

The rest of this is what I understand from what I have read on the Internet, I've no direct experience of it to modify my impressions. A good read is (5).

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I mentioned that centimetre accuracy can be obtained from GPS. As it is, in my set up, the accuracy is enough to just differentiate the two sides of a single carriageway main road. Bad data, e.g. from being under trees, misses some points out so it may not give a really true picture of a bendy road.

A better fix can be obtained, if you are stationary, by taking an average over a long period, and picking out the readings with a low DOP, I may revisit this to see what happens, but there's not much further I can go with the equipment I have.

To get a much higher accuracy a procedure called 'Differential GPS' is used. When observing the position reported by a stationary receiver, the decimal points of the seconds of arc 'dither', as seen on the display of part of a data file, figure 4. Successive calculations give slightly different results, and the device itself cannot know whether this is really due to the antenna making small movements, or to errors inherent in the system, at a stationary receiver, from small wobbles in the orbits and propagation conditions for the signal as it travels through the ionised layers of the atmosphere.

Now we can assume that two GPS receivers, not too far apart, experience exactly the same errors, with the true difference between their positions at the same instant being given by the difference between the calculated positions, with the errors cancelling out. 'Not too far apart' can, apparently, be 30 to 100km.

If one, reference, receiver is placed at an accurately known location as a control station, the 'wobbles' in apparent position there become known errors, so the other receiver, usually roving around an area being surveyed, can derive its own position very accurately by applying the 'wobbles' in reverse to its own readings. In practice this can be exploited in several ways: a succession of readings are taken at the reference point over a session, and the corrections collected during the day are correlated at the office in the evening; alternatively it can be done 'on the fly' using a radio link to send the corrections to the roving apparatus, the latter option being more expensive of course, but it does allow for continuous checking and immediate dealing with dodgy fixes without having to revisit the site. Either method brings the accuracy down to the metre region, and there are further refinements of technique if accuracies down to the centimetre level are required.

The OS now uses this method, and has surveyed a number of the old triangulation pillars to a very high accuracy, and additional control stations have been built, with the data available free on the Internet. These are 'Passive' stations -- you have to provide your own equipment. A number of 'Active ' stations also exist, which broadcast the correction data to be picked up at a survey site in the appropriate area. Links to lists and details are in (4).

Sources and References

I have no connection with any of the organizations cited except as a happy user of their products.

(1) http://www.rfsolutions.co.uk/acatalog/Board_Level_GPS_Receiver_M
Data sheet DS301

(2) --do-- data sheets DS031 for GM001 and DS303 for the antenna

(3) http://www.holux.com.tw
Module GM210

(4) http://www.ordnancesurvey.co.uk/gps
A mine of information. In particular the OS document "A guide to Coordinate Systems in Great Britain", is essential: it's one of the most useful and most quoted. The site also has details of the Active and Passive networks of reference sites for Differential GPS.

(5) http://www.englishheritage.org.uk/upload/pdf/where_on_earth_are_we.pdf
A booklet "Where on Earth are We? The Global Positioning System(GPS) in archaeological field survey" A very readable and beautifully presented paper. I recommend this as the first to read.

Only one caveat: the diagram to illustrate Differential GPS on page 9 is misleading as it shows the paths from the satellites diverging towards the two receivers, whereas the satellites are so remote that the paths are almost exactly parallel, which is the whole point of it.

(6) http://www.wgs84.com/

(7) http://www.gps.gov.uk/ the gateway to a vast range of useful information.

(8) "Greenwich Time and the Longitude" by Derek Howse ISBN 0-85667-468-0 p160 .

(9) NMEA itself can be found at http://www.nmea.org, but it seems that you have to be a member to access their information. A useful guide to the standard sentences is accessible via http://www.gpsinformation.org/dale

(10) www.colorado.edu/geography/gcraft/notes/gps/gps.html
Peter H. Dana, The Geographer's Craft Project, Department of Geography, The University of Colorado at Boulder. A detailed but rather technical overview of the GPS system by, I believe, one of the designers.

(11) http://sideshow.jpl.nasa.gov/mbh/series.html
This internet address is on a map of the world showing the relative tectonic movements. I have lost the original reference.

(12) "Everyday Practical Electronics" magazine: http://www.epemag.co.uk

(13) SMSQ/E for QPC manual revision 2.08 pages 9, 10

(14) SMSQ manual revision 8 pages 27, 28

(15) "QL SUPERBASIC the definitive handbook" by Jan Jones ISBN 0-07-084784-3

(16) "Eats, Shoots & Leaves" by Lynne Truss ISBN 1-86197-612-7
 The source and inspiration for all those colons and semi-colons.

Illustrations

   (a)   Orbits as "lines" over a five hour period (fig 8)
   (b)   The track from Bognor Regis to Petersfield (fig 9)

(We will be continuing this article in the next issue of QUANTA Magazine when Hugh will tell us about his GPS Hardware and other refinements. [Ed].

SALES AND WANTED   John Gilpin

Wanted:

External disk drive units (or cases) - single or dual units. There must be plenty out there from people who have upgraded.

For Sale:

    10 - Epson Stylus Colour 850 printers
     2 - Epson Stylus 900 printers
        HP Deskjet 660C Inkjet printers

All **ONLY** £40.00 each plus £15.00 post and packing

Contact: Rich Mellor, 3, Dale View Court, Fulford, Stoke-on-Trent, Staffordshire. ST11 9BA or by email at:

rich@rwapservices.co.uk

Wanted:

QUANTA are always on the lookout for Second User QL related items which are no longer required by their owner.

Do you know where there is some hardware, Software (original) books etc laying about doing nothing? Give me a call or send me an email.

John Gilpin QUANTA Treasurer. Contact details inside front cover.

For Sale:

QUANTA have the following second user Items for sale:

Reformatted Microdrive Cartridges - 25 in Transform Case - £1.50
- ditto - 4 in Plastic Wallet - £0.30
Reformatted 3.5" DD Floppy diskettes - £0.20 ea - 10 for £1.50
                        100 for £11.50
Jan Jones' Book "QL SuperBASIC - The Definitive Handbook"
This is the book which no Qler can afford to be without and the one which QUANTA did a Limited Reprint Edition in 1989 after the original print run sold out so quickly. **A Real Bargain at £1.00 each.**

All the above items are subject to post and packing charges at cost.

Enquiries to treasurer@quanta.org.uk

FUBUKI   Steve Poole

The QL Community has spent a lot of time developing Soduko programs. As always, I intend to produce a mix of code both for adults and younger people, as the latter need programs and programming as much as we older ones do. So this one is mainly for your youngsters, but first a few comments.

When digital media was first produced, we were told that it was better and more reliable than analogue supports. Yet CD's often get stuck in closed loops, where a scratch on a Vinyl Disk would only produce a click, but continue playing. Indeed Digital Radio (or Podcasts), often produces annoying gaps in transmissions, and Digital TV is no better. But why?

Way back in the early days of computer development, it was realised that packets of data would often arrive containing transmission errors, so people tried to develop methods of error-detection and error-correction. The simplest method would be to send the same data three times, allowing both detection and correction if there were only a few errors.

Another simple method was the parity-bit : In each octet sent, the eighth bit would represent the parity of the sum of the other seven bits : On reception, if the parity was wrong, the receiver would request that the octet be sent anew... This method is simple, and is often used as a first detector.

A second means is the so-called 'checksum': After transmitting a fixed number of octets, the total sum of their bits is compared to the final data, and this indicates any errors. But as is always the case, zeroing '1's and setting '0's can cancel each other out if the parities or checksums are themselves erroneous, so errors or no errors can be falsely assumed!

A much more serious attempt was the so-called 'Hamming Code' which transmitted octets as arrays of bits, the sums of bits 'across' being represented by a parity bit, and the sums of bits 'down' likewise. This grid allowed easy detection of erroneous bits, and by cross-referencing the parities, even allowed error-correction by the application of 'Mastermind'-like logic. But the system again is plagued by multiple errors causing frequent repetitions of transmitted blocks of code. The system rapidly clogs up, especially when transmission-lines are 'noisy'.

As the technical progress of the latest gadgets races ahead, the world's telephone lines being relatively old and out-of-date, transmission-

noise is rife on the web, and error-correction code often inefficient, leading to disconnections, freezing, bugs and suchlike.

This FUBUKI program uses a similar logic to 'Hamming Code'. Indeed, budding programmers might like to get the QL to play itself, which could end up by one of them discovering a revolutionary new error-correction algorithm. But remember, data requires individual bits to be compared, so such a program would need to be written using pseudo-binary strings if you wish to see output on the screen. And remember, the more simulated errors there are, the more sophisticated the correction-code has to be. Is there an optimum?

Fubuki is a great game for children learning arithmetic as it tests their knowledge of tables at difficulty '4', but requires pure adult logic at harder levels.

To play the game, choose a difficulty level, then hit either the arrow-keys to move the cursor, or the numbers 1 to 9 to try to input a digit. When the game is over, you see your score so you can estimate your progress.

Bruno Coativy has noticed a program-quirk: If there is more than one solution, a logically valid figure input may be refused. So now you know why... If you are looking for a programming project, try eliminating this quirk...

Best Wishes,

```
100 ::
110 REMark Fubuki_bas, by S.Poole, v23jan2007
120  REMark for Quanta.
130 :
140 CLEAR: OPEN#1,con_16: WINDOW 512,256,0,0
150  PAPER 0: INK 7: STRIP 1: CLS: CSIZE 0,0
160  INPUT 'Difficulty 4(easy) to 1(hard)?'!difficulty
170  CSIZE 3,1: n$='123456789': x$='*********'
180  kt=0: game_over=9: try_again=0
190 :
200 REMark Get randomised grid:
210  FOR f=1 TO 9
220     n=RND(1 TO 9): IF n$(n)='*': GO TO 220
230        REMark mask off chosen numbers:
240     n$(n)='*': x$(f)=n
250  END FOR f
260 :
```

```
270 REMark Get totals across:
280  FOR f=1,2,3: x1=x1+x$(f)
290  FOR f=4,5,6: x2=x2+x$(f)
300  FOR f=7,8,9: x3=x3+x$(f)
310 :
320 REMark Get totals down:
330  FOR f=1,4,7: x4=x4+x$(f)
340  FOR f=2,5,8: x5=x5+x$(f)
350  FOR f=3,6,9: x6=x6+x$(f)
360 :
370 REMark Print totals across:
380  AT 1,9: PRINT x1
390  AT 4,9: PRINT x2
400  AT 7,9: PRINT x3
410 :
420 REMark Print totals down:
430  AT 9,1: PRINT x4
440  AT 9,4: PRINT x5
450  AT 9,7: PRINT x6
460 :
470 REMark get the given numbers:
480  FOR f=1 TO difficulty
490      REMark Only get nos for masked positions:
500      rd=RND(1 TO 9): IF n$(rd)<>'*': GO TO 500
510      n$(rd)=x$(rd): kt=kt+1
520  END FOR f
530 :
540 REMark Draw the Grid:
550  ct=1: FOR j=1,4,7
560      FOR f=1,4,7: AT j,f: PRINT n$(ct): ct=ct+1
570  END FOR j
580 :
590 REMark Play the game:
600  xx=1: yy=1: tries=0
610  left=192: right=200: up=208: down=216
620  REPeat try
630      i$='': flash_cursor: IF i$='': NEXT try
640      move_cursor: num=i$ INSTR '123456789'
650      IF num: IF num_ok=game_over: EXIT try
660  END REPeat try
670 :
680  CLS: PRINT 'Another Game? y/n'
690  i$=INKEY$(#1,-1): IF i$=='y': RUN
700  CSIZE 0,0: CLS: WINDOW 256,206,256,0: CLS: STOP
710 ::
720 DEFine FuNction num_ok
```

```
730 REMark Find the string index number:
740 SELect yy: =1: SELect xx: =1: f=1: =4: f=2: =7: f=3
750 SELect yy: =4: SELect xx: =1: f=4: =4: f=5: =7: f=6
760 SELect yy: =7: SELect xx: =1: f=7: =4: f=8: =7: f=9
770 tries=tries+1
780 :
790 IF i$=x$(f) THEN
800    REMark Mask off correct no:
810    AT yy,xx: PRINT i$: x$(f)='*'
820    kt=kt+1: BEEP 12345,6
830    :
840    IF kt=9 THEN
850      AT 11,1: PRINT 'Bravo!'!'in'!tries!'tries'
860      i$=INKEY$(#1,250): RETurn game_over
870    END IF
880    :
890    REMark Sorry! wrong number:
900    ELSE BEEP 12345,99
910 END IF : RETurn try_again
920 END DEFine
930 :
940 DEFine PROCedure move_cursor
950 REMark But stay on grid:
960  cd=CODE(i$): SELect cd
970      =left : xx=xx-3: IF xx<1: xx=1
980      =right: xx=xx+3: IF xx>7: xx=7
990      =up:   yy=yy-3: IF yy<1: yy=1
1000      =down:  yy=yy+3: IF yy>7: yy=7
1010    END SELect
1020 END DEFine
1030    :
1040 DEFine PROCedure flash_cursor
1050  REMark For EXEC use INKEY$, not PAUSE:
1060  REMark Test three INKEY$ immediately:
1070  OVER -1
1080  AT yy,xx: i1$=INKEY$(#1,1): PRINT '_'
1090  IF i1$<>": i$=i1$
1100  AT yy,xx: i2$=INKEY$(#1,1): PRINT '_'
1110  IF i2$<>": i$=i2$
1120  i3$=INKEY$(#1,1): IF i3$<>": i$=i3$
1130  OVER 0
1140 END DEFine
1150 ::
```

End of Listing.

LUNAR LANDER   Steve Poole

With inspiration lacking for any new maths programs, I decided to write another game. But with ideas lacking here too, I went in town to a toy shop and perused their stock, but there was nothing suitable there either.

For years I have wanted to write a Lunar Lander program, but the need to define sprites put me off. I have written my own sprite-designer code, but for the Quanta magazine this would mean typing in far too many DATA entry lines. Suddenly it occurred to me that I could replace sprites by numbers, and in a trice I had roughed out some prototyping notes. Within an hour or so, I had the game typed in and on the whole it worked as expected.

But there was a nasty bug which prevented the game from finishing completely, and having encountered a 'fatal error' in QPC2, I thought it was because QPC2 was playing up and so it took me six hours before I eventually realised what was going wrong. I then added line 490 to cure the problem!

This was because, even by inserting long pauses between every code statement to analyse the fault, top-column overwrites were far too fast for the eye to detect, and therefore incremented the exit-count so the game would end before having filled all the cells! The final solution was to add BEEPs to each of those pauses, as sound sustains itself long enough to reveal snags... A few strange clicks in odd places soon put me on the trail, and I realised I had omitted one vital line when entering my prototype handwritten code. This is the sort of thing that happens when you get deep into rearranging and optimising your program!

So how does the program work? Just run it and answer the two initial questions by touching keys. The difficulty level sets the grid size. Then the grid is drawn, with random numbers printed below the bottom line. Next at the top of the grid a random number will appear in one of the columns, and it is your job, using the left and right arrow-keys, to guide it down and onto its corresponding number on the bottom line. If you succeed, it disappears, but otherwise you have crashed onto the wrong number, and so the sprite remains on the cell. This, of course, gradually fills up the screen from bottom to top, causing obstacles and making your task more difficult. If you cannot reach your desired column, you can head for a similar number elsewhere if it lies at the top of a pile, where on landing it will disappear too... earning you

points... and giving you a second chance to 'reorganise' the landing-sites! This is part of the winning strategy of course, but I shall say no more...

As the game progresses and obstacles build up, you have less time for your decisions and reflexes, and towards the end... pure panic sets in! When the dust settles down, your final score is given as a percentage of successful landings, and you are given the chance of a new game. The key to success is to keep lucid at first and not to panic...

Where do we go from here? Try substituting letters for numbers, which would allow a much larger grid, although nine sprites seem about enough for one game. Or, use '0's flying upwards from below as 'explosive missiles' to avoid or shoot at. But at 94 lines, I think the program is quite long enough for members to type in already. I have commented the code with appropriate REMarks, and broken it down into logical blocks using single-line ':' spacers. Perhaps the best trick in the coding is the concatenation of i1\$&i2\$&i3\$&i4\$ to test multiple INKEY\$ for a key press. This checks four pauses simultaneously and therefore smoothes out the screen handling...

Time will tell at what level will be situated people's high-scores. This is where tweaking the 'ps' & 'ps2' pause statements on line 250 is important, as the reaction-rates are crucial to optimal playing pleasure. This is where Beta-testing is vital in program development, and where finalising the code for publication is a big time consumer. It may not look much like a lunar lander as it stands, but all the basic principles are there. Convert numbers to sprites if you wish and whatever you do, keep programming.

Happy Swerving.

```
100 ::
110 REMark Lander_bas, by S.Poole, v28mar2007
120  REMark for Quanta. Beta-test by B.Coativy.
130  CLEAR: OPEN#1,con_16: MODE 8: WINDOW 512,256,0,0
140  PAPER 0: INK 1: CLS: CSIZE 3,1
150 :
160  PRINT\\' Another Game (y/n)?': i$=INKEY$(#1,-1)
170  IF i$=='y': ELSE : CSIZE 0,0: MODE 4: CLS: STOP
180 :
190  PRINT\\' Difficulty (4 to 9)?': i$=INKEY$(#1,-1)
200  IF (i$='') OR (i$<4) OR (i$>9): GO TO 190
210  q=i$: q1=q+1: q2=q+2: qq=q*q: DIM t$(q,q2)
220 :
```

```
230  REMark Initialise Global variables:
240  n$='123456789': left=192: right=200
250  hit=0: ct=0: kt=0: ps=6: ps2=24
260  CLS: AT 0,1: PRINT'Landed:': AT 0,16: PRINT'Crashed:'
270 :
280 REMark Draw the Grid:
290  FOR x=1 TO q
300     FOR y=1 TO q: AT y,x*2: PRINT '_': t$(x,y)='_'
310  END FOR x
320 :
330  REMark Jumble the bottom-line numbers:
340  FOR x=1 TO q
350     m=RND(1 TO q): IF n$(m)='*': GO TO 350
360     n$(m)='*': t$(x,q1)=m
370     AT q1,x*2: INK m,m+5,2: PRINT m
380  END FOR x
390 :
400 REMark Main game:
410 REPeat loop
420    REMark choose a random lander and column:
430    IF ct>=qq: EXIT loop: ELSE kt=kt+1
440    x=RND(1 TO q): n=RND(1 TO q): nn$=n
450    :
460    REMark Float downwards:
470    FOR y=1 TO q
480       REMark Is the column full?:
490       IF t$(x,y)<>'_': NEXT loop
500       :
510       REMark Flash the module:
520       IF t$(x,y)='_' THEN
530          AT y,x*2: INK n,n+5,2
540          PRINT n: k$=INKEY$(#1,ps): i2$=k$
550          :
560          REMark pause the top line lander:
570          IF y=1: i1$=INKEY$(#1,ps2): ELSE i1$=''
580          :
590          AT y,x*2: INK 1
600          PRINT '_': k$=INKEY$(#1,ps): i3$=k$
610       END IF
620       :
630       REMark Did you land on the right number:
640       IF t$(x,y+1)=nn$ THEN
```

```
650       BEEP 1234,5: hit=hit+1
660       AT 0,10: PRINT!hit: AT 0,24: PRINT!ct
670       NEXT loop
680     END IF
690     :
700     REMark You missed, so mark the cell:
710     IF t$(x,y+1)<>'_' THEN
720       t$(x,y)=nn$: ct=ct+1
730       AT 0,10: PRINT!hit: AT 0,24: PRINT!ct
740       AT y,x*2: INK n,n+5,2: PRINT n: NEXT loop
750     END IF
760     :
770     x=Move_lander(x)
780     :
790   END FOR y
800 END REPeat loop
810 :
820 AT 0,1: CLS 3: PRINT'Score:'!INT((hit*100)/kt)&'%'!
830  PRINT!'Hit any Key...'
840  i$=INKEY$(#1,-1): GO TO 140
850 ::
860 DEFine FuNction Move_lander(xx)
870  LOCal x: x=xx: i4$=INKEY$(#1,ps)
880  ky$=i1$&i2$&i3$&i4$: ky=CODE(ky$)
890  SELect ky
900    =left:  x=x-1: IF x<1: x=1: IF t$(x,y+1)<>'_': x=xx
910    =right: x=x+1: IF x>q: x=q: IF t$(x,y+1)<>'_': x=xx
920  END SELect : RETurn x
930 END DEFine
940 ::
```

End of listing.

Using SSSS(3)   George Gwilt

P reviously I described a method of using the SMSQ/E Sampled Sound System (SSSS) to play files. I also discussed a way of producing files which can be played to produce sounds. I will now describe a program "sound" which enables a user to define sounds, to store them and to play them.

On starting the program, eg with EX sound, the following window appears.
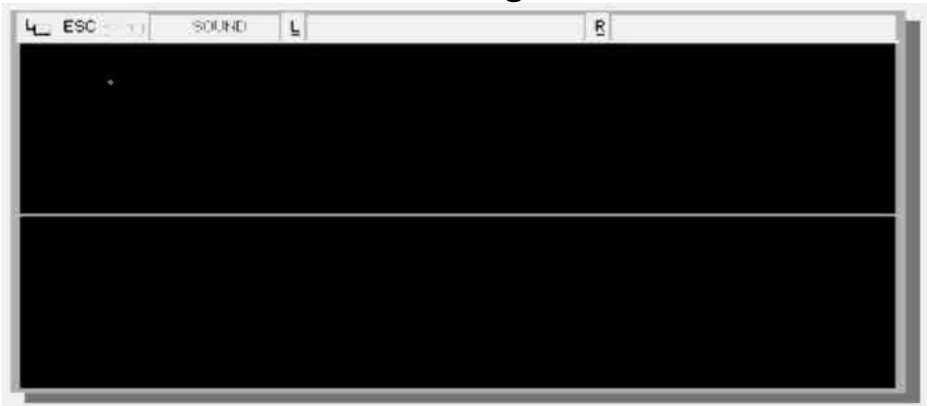
At this stage you can operate the items; the move icon, ESC, L and R but not Play. You can even put the program to sleep, into a button, by pressing CTRL/F1. You can move the window by clicking on the move icon or by pressing CTRL/F4. You can quit by clicking on ESC or pressing the ESC key. You can load a file for the left or right speakers by typing L or R or clicking on these. If QMenu is present it allows you to choose the filename for input. If you give the name of a file containing a definition of the sound you want in the form described previously the program will calculate the sample values and set them in a file with the same name with "_w" added. It will then load this file ready for playing. In order that you can tell what you have loaded, the file name is printed in the space just to the right of L or R in the top line. In addition, to give you some idea of the wave form you have loaded, the first section is printed in the window. The graph of the left hand sound appears above that for the right. When the information for both speakers is loaded (and you can load the same file to both speakers and have a mono sound) the Play icon becomes available as you can see below.
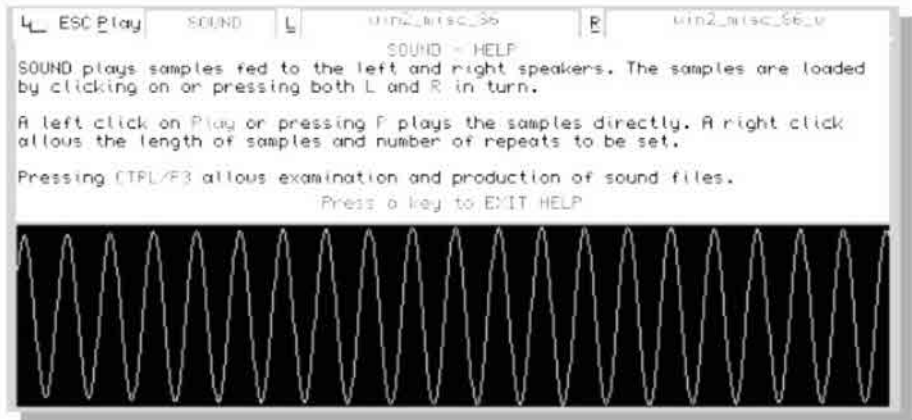
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A right click on Play (see below) brings up a window allowing you to choose the number of samples to play up to a total of 20482. You can also choose the number of times the samples should be played. When you have chosen these, pressing the letter key O, or clicking OK, will cause the samples to be played. A left click on Play or pressing P will just cause the samples to be played using the size and number of repeats already determined.
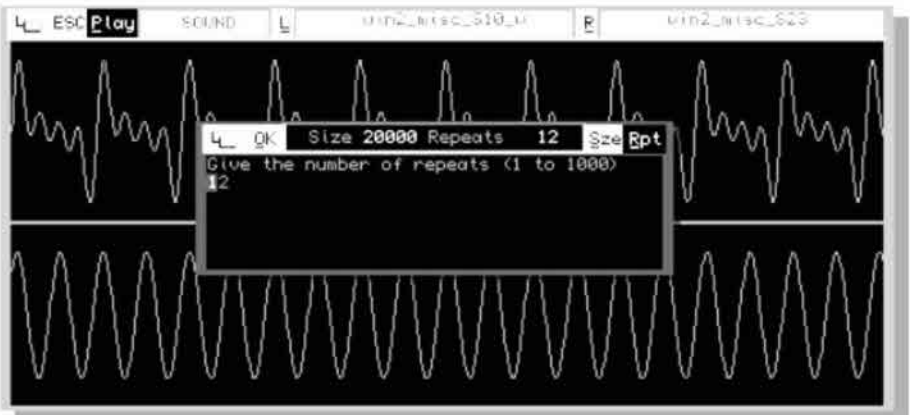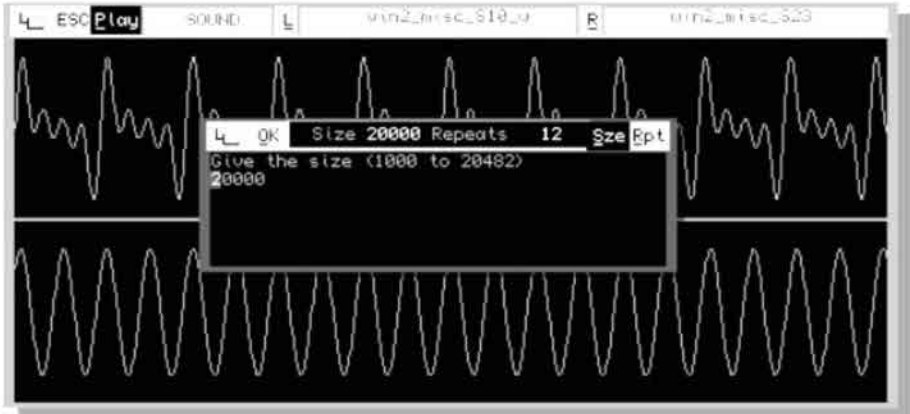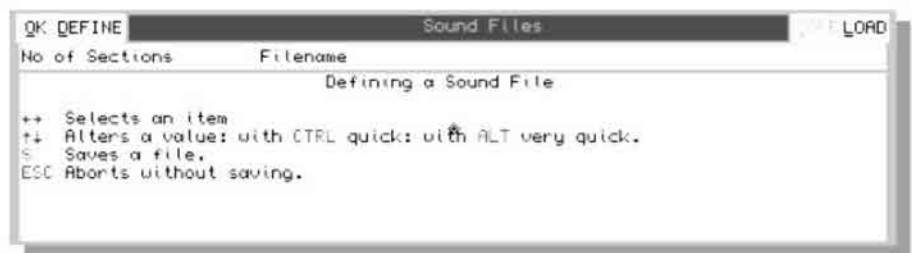

There are just two other functions available. Pressing F1, for help, brings up a help window.

```
4_ ESC Play    SOUND    L      win2_misc_36        R     win2_misc_36_v
                              SOUND - HELP
SOUND plays samples fed to the left and right speakers. The samples are loaded
by clicking on or pressing both L and R in turn.

A left click on Play or pressing P plays the samples directly. A right click
allows the length of samples and number of repeats to be set.

Pressing CTRL/F3 allows examination and production of sound files.
                         Press a key to EXIT HELP
```

Finally the program "sound" allows you to set up sound files. If you press CTRL/F3 another window appears as shown here:


```
OK DEFINE                    Sound Files                         LOAD
No of Sections        Filename
                         Defining a Sound File

++  Selects an item
↑↓  Alters a value: with CTRL quick: with ALT very quick.
S   Saves a file.
ESC Aborts without saving.
```

With this window you can examine an existing file by loading it. Just press L and select the file you want. An example of what happens is shown below:

| OK DEFINE | | | | Sound Files | | | | SAVE LOAD |
| No of Sections | 8 | Filename RAM1_qr1 | | | | | | |

	1	2	3	4	5	6	7	8
Fr	332	632	932	232	532	1232	152	132
Am	255	221	241	221	117	126	240	121
Ph	0	0	0	0	0	0	0	0
PF	1	1	1	1	1	1	1	1
PA	1	1	1	1	1	1	1	1
PP	1	1	1	1	1	1	1	1
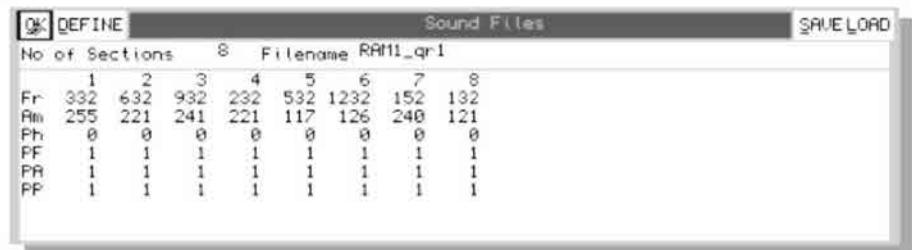
TRADER'S CORNER

QUANTA recommends the following trading members to supply all your QL requirements, information and advice.

Trader's Advertisements can be viewed at:

http://www.quanta.org.uk/traders

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If at this stage you press D or select DEFINE you will be able to edit the numbers given. This includes the number of sections. An item is selected by the left and right arrows whih take you backwards and forwards through the numbers as though they were lines in a book. If you alter the number of sections, as soon as you press the right arrow, S (for save) or ESC the selected number of sections is displayed.

Any files saved are guaranteed to be valid so that they can be played by "sound".

You might like to know what sound wave was produced by the file RAM1_qr1 shown above. Here it is:
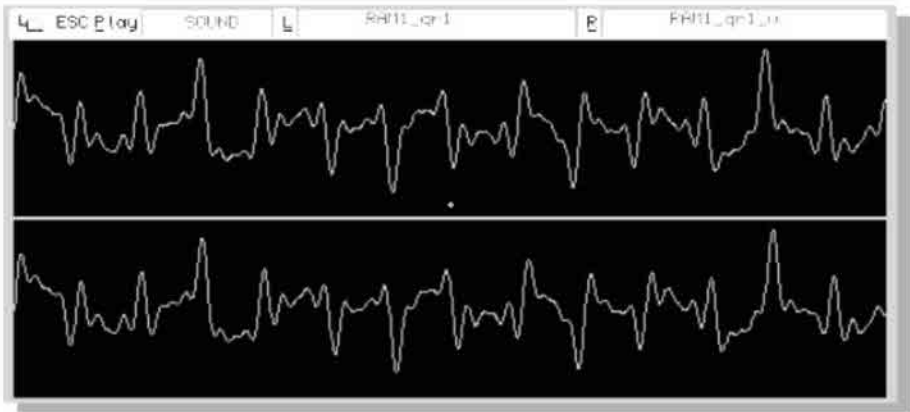
Operating Hints

The sounds that are played by this program are of two sorts. Type A is a note, possibly of complex structure, which does not vary in pitch or intensity. Type B is a sound which varies in one way or another.

The default values of size of sample and number of repeats are 1000 and 1. This gives a pretty short beep. If you want to hear a sound of type A over a longer period you might like to try 1000 for the sample length and set the repeats to 30. This will give about a second and a quarter's noise, enough to hear what the sound is like but not long enough to set the neighbourhood dogs barking. For type A sounds there is no need to take a sample much longer than the minimum 1000 since the wave is repeated without variation over the whole length of 20482.

However, you may notice that at the start of each repeat there is a click. This will be due to the fact that the position in the sine wave at the end of the sample size you have picked is at a different place from that at the

start. In that case, instead of having a smooth transition from the end of one repeat to the beginning of the next you have a sudden change which causes the click. To avoid these clicks the sample size must be set correctly. For all sounds with an integral frequency there will be an integral number of sine waves over 20000 samples. So, if you pick a size of 20000 you should not hear clicks. If, for example, the frequency were 440 you would have 440 complete sine waves over 20000 samples, 220 over 10000 and 22 over 1000. Thus picking 1000 would give you clickless sound for frequency 440.

For type B sounds you will not hear the total variation unless you choose a size of 20482 which is the maximum.

Warning

SSSS in versions of QPC2 up to 3.33 unfortunately send the information for the left speaker to both left and right speakers and ignore the information for the right speaker. This means that stereo effects cannot be produced by "sound" with QPC2.

QL NEWS

ZIP MANAGER   **by Dilwyn Jones**

I've added a new program called Zip Manager to my website. This freeware program acts as a pointer driven front end for the Zip and Unzip programs, to make them a bit easier to use.

Written as a follow up to the Zip and Unzip short series in QL Today, this program is a menu driven front end system, based on my Q-Trans program. It requires Window Manager 2 (uses System Palette colour themes) which means you must have SMSQ/E version 3 or later, or QDOS with pointer environment version 2 or later.

You can add or delete files to or from a selected zip archive, and delete or view files. If you use FileInfo 2, Zip Manager is aware of that and so viewing may be achieved via the file associations defined. If you have a favourite editor or viewer program such as QD or S-Edit, you can set up Zip Manager to fire up that program to view files contained in zip files.
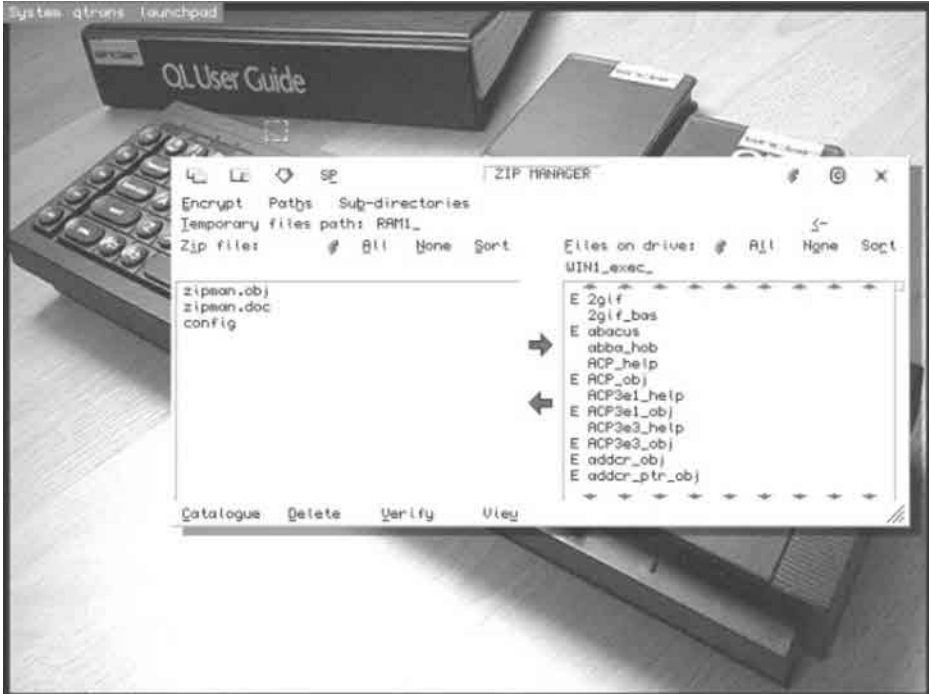
Zip Manager lets you choose whether filename paths or just pure filenames are stored, lets you add password protection to new Zip files if required, and even control whether Zip processes sub-directories when

adding to zip files.

Zip Manager is available to download from my website at:

http://www.dilwyn.uk6.net/arch/index.html

Zip Manager by Dilwyn Jones

PCB CAD UPDATE

Malcolm Lear has kindly sent me v6.16 of his PCB Cad program, which I have uploaded to the Graphics page on my website. Here is Malcolm's description of the update:

> Quite a few changes this time. Most important is proper behavior on
> shutting down and releasing allocated memory and a persistent bug
> that stomped on the PE has been sorted.

It may be downloaded from:

http://www.dilwyn.uk6.net/graphics/index.html

Eindhoven Meeting dates in 2007

The only date left on the Eindhoven calendar for 2007 is
20 October 2007

As our meetings are workshops as well, bring along your QL hard/software. Foreign visitors are welcome at all our meetings

A CAUTIONARY TALE   John Gilpin/Steve Poole

*O*ne would guess that all experienced computer users would know all about the drastic effects of **/**lightning**/** (drum role, flashes and bangs etc.) but here is part of a letter I recently received from Steve.[Ed.]

"My wife and I are lucky to be alive. When Lightning hit our house, there was in line : PC, me, Halogen lamp, Annick, central heating oil stove, each separated by about 3 feet... the thunderbolt took out the appliances and left us scot free! To be precise, it was not fork lightning but ball lightning. the balls came through the roof without leaving a trace and made noisy bangs when 'popping'. The computer power line has lightning protection, but the ball went in down the telephone cable and caused various components of the 56k modem to explode. The halogen transformer is grilled and the central heating blew an internal fuse. The insurance coughed up minus 30 per cent depreciation for two year's of age. There were plenty of people affected in our neighbourhood during that storm, but no injuries reported, at least to humans."

How many of us need to take a serious look at all forms of protection for both our equipment and ourselves? Thanks for sharing your traumatic experience with us Steve. [Ed.]

GRID (SCREEN SAVER) UPDATE   Steve Poole

Having received a query from a QUANTA member regarding ways to STOP my programme GRID (Screen Saver) published in the Feb/Mar Issue of QUANTA Magazine, one easy way to do this is to insert an extra line in the SuperBASIC code:

```
325 i$=INKEY$(#1,1) : if i$=='Q' : STOP: REMark (Q)uit...
```

This should cause the programme to stop if the "Q" key is pressed.

Would anyone like to send in suggestions as to how Steve's stand-alone programme could be further developed to become a fully functioning Screen Saver? Submissions to editor@quanta.org.uk.

QUANTA WORKSHOPS   Sarah Gilpin

Following QUANTA Committee policy to support at least two QL Workshops each year, it has been suggested that we approach the West Midlands QL User Group.

Mike Bedford White has approached the Queens Head, 28, Steelhouse Lane, Central Birmingham B4 6BJ where the West Midlands QL User Group usually meet and arranged a date.

On **Saturday October 6th 2007** a Quanta supported workshop will be held in Birmingham. **Put this date in your diaries, and come along.** We will arrange for some speakers and we hope all the traders will come.

This will be an excellent venue half-way between South and the North and no-one will have to travel too far. Come and join us there and support Mike's Venture.

Full details should be available for the next Issue of QUANTA Magazine

YOUR QUANTA NEEDS YOU   John Gilpin

Over the last seven years, there have been only thirteen different people involved on the Quanta Committee. At the beginning of this century, the committee was seven strong carrying out ten specific jobs. Anyone who has held an honorary position on a committee will accept that it is difficult to find people (with the required skills) who will give up a little of their time to serve any organisation.

QUANTA whilst still carrying out the same ten specific jobs now has only four committee members who, between them, are attempting to keep their heads above water and satisfy a membership of almost 200 members. While some of the double jobs we do go nicely with one another, there are other jobs which are at risk of not being done at all unless we can involve some new people to help.

Changes to the QUANTA Constitution in 2005 intended to give the committee members a break after 6 years (3 years as an officer) mean that the present committee should all take a break in the next couple of years. Personal requests for other members to replace them have fallen on deaf ears so this is our appeal to all the remaining QUANTA members to get involved **NOW** or is it the request of the membership that QUANTA should be wound up in the next couple of years and give all our assets to The British Red Cross Society as detailed in the constitution?

THE CHOICE IS YOURS !

MEMBERSHIP RENEWALS   John Gilpin

Over the past couple of years, it has taken progressively longer to collect all the membership renewals. I have recently received (in June) a membership renewal due last January! With this issue some of you will receive a membership renewal form and a letter advising you that your subscription is expiring. If you receive one of these forms, and you wish to continue your membership of QUANTA, please complete the form and return it to me promptly so that I am not still doing renewals in December/January when I am trying to complete the Annual Accounts.

Quanta Magazine

To those of you who return your forms promptly - and there are quite a few, my grateful thanks.

On the new forms, there is a space for you to advise us whether you want to receive your magazine as a hard copy booklet (as in the past) or by email as an electronic attachment in Adobe .PDF format. Anyone who wants to change to electronic format (without a renewal form) should send a blank email with the subject "Quanta Electronic Magazine" to our secretary at secretary@quanta.org.uk. All requests will be acknowledged.

SUBGROUP MEETINGS

THE WEST MIDLANDS QL USER GROUP

This long-running group has moved back to its previous venue, the Queens Head pub in the City Centre. Meetings remain open to Quanta members and non-members alike. The Queens Head is in Steelhouse Lane, Central Birmingham, four minutes walk from Snow Hill main-line railway station and has ample street parking nearby.

Meetings are usually on the first and third Monday of each month (but not on Bank holidays unless the previous one was cancelled for that reason). After your first meeting you're expected to pay £1 each time towards the organisation and monthly newsletter costs - except once a year when the group pays all those who attend a pound instead (We provide food twice a year for those who attend the AGM and the group's birthday party) and at meetings we discuss all sorts of things, QL-related and otherwise, usually from about 8:20pm onwards till 10:30 or later. The group owns QL hardware, a disk library and subscribes to relevant magazines. People can join the mailing list for £3.50 per year, even if they can't attend regularly.

The contact number remains Mike Bedford White's, on 0121 708 2560, anytime after 11 am.

QUANTA DORSET SUBGROUP

Meetings are held, on the second Sunday of each month at the Merley Community Centre in Harrier Drive, Merley, just south of Wimborne Minster. Time: 2.00pm to 5.00pm. All are welcome.

John Meadows Tel: 01202 576189, or John Mason, 01425 275894.

LONDON QL AND QUANTA GROUP

Meetings are held in the School Room, which is the basement of the Borough Welsh Congregational Chapel, 90, Southwark Bridge Road, London SE1. This is almost opposite the junction with Marshalsea Road, at the other end of which, 5 minutes walk away, is the Borough Underground Station. Free parking is easily available in Southwark Bridge Road for road users, Cyclists are welcome.

Members currently each pay a subscription of £30 per year towards the cost of the hire of the hall and a small additional charge is made for tea/coffee - biscuits are then provided free.

Please bring your QL equipment if possible, all types welcome, e.g., PC portable running emulators. The Group has some systems stored at the venue for its use. In addition, there are lots of donated second user equipment, books, magazines, etc, available for purchase.

Time: 2.00pm to 6.00pm, on the second Sunday of the month.

No meetings are held in either December - winter break, or August - summer break. Giving 10 meetings a year.

Malcolm Cadman: Tel: 020 8691 5780; email: QL@mcad.demon.co.uk

NEMQLUG - THE NORTH EAST MANCHESTER QL USER GROUP

Meetings are held at 181, Urmston Lane, Stretford, Manchester. M32 9EH (Near Junction 7 of M60 Motorway - Was Junction 7 M63 Motorway). Our informal meetings start at 7 p.m. and finish at 11p.m. All welcome.
Meets on the last Thursday of each month (except December).

John/Sarah Gilpin 0161-865 2872   (thegilpins@btopenworld.com)

SCOTTISH QL USERS GROUP

SQLUG meets at George Gwilt's home every second Sunday in the month. Please contact George Gwilt before coming to get the location.

Geogwilt@aol.com

SOLENT SUBGROUP

Meets at Botley Market Hall, all welcome. Park at the back and use side entrance.

1st Saturday of the month from 2.00 pm to 6.00 pm.

Graham Evans, Tel: 023 8040 3350.

SURREY QUANTA SUBGROUP (SQSG)

Venue is St Giles Church Hall, Ashtead. (This is the other side, towards the downs, of the main Epsom - Leatherhead road, up Park Lane which is at the Epsom end of the town).

From 8.00 to 10.30 pm on the last Wednesday of each month, except December.

Ken Bain 01932 347 432 (to midnight), kenb@bcs.org.uk

SUSSEX QL USER GROUP

Currently without a meeting place, anyone interested should contact Keith Mitchell or Roy Wood.

Roy Wood, 01273 386030 or Keith Mitchell, 01903 742263.